

First Do No Harm: Are You Creating Health Problems in Your Homes? IBS 2015, Las Vegas, NV

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Homeowner Health
Indoor Environmental Quality – IEQ
AKA Indoor Air Quality – IAQ

What Affects IEQ?

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____



What To Do With Pollutants?

- Eliminate
 - _____
- Separate
 - _____
- Ventilate
 - _____
 - _____
- Filter
 - _____

Improving IEQ

- Control:
 - Construction Techniques
 - Material Selection
- Influence:
 - Occupant Behavior

Control:

- Moisture – Vapor and Water
- Carbon Monoxide
- Dirt
- Radon
- Chemicals
- It Takes Effort (Doesn't Everything?)

Moisture

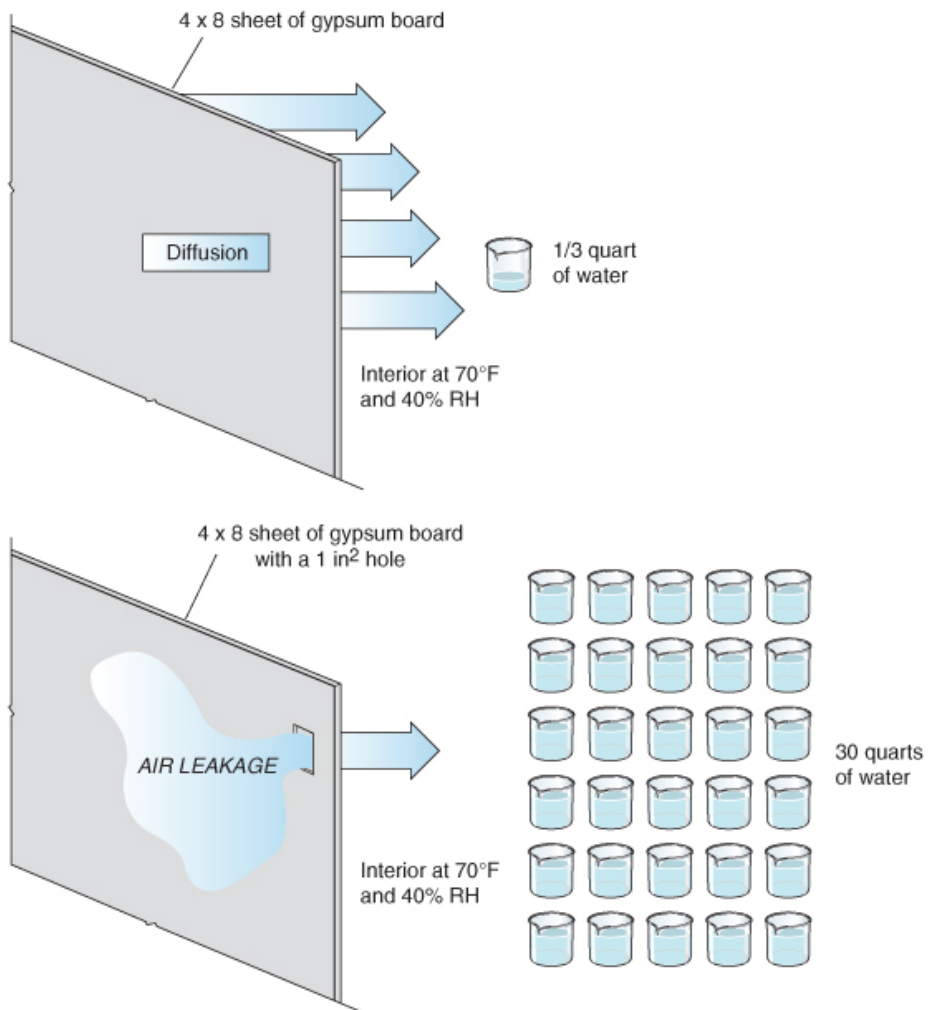
- Humidity
- Too Much = _____
- Too Little = _____
- Just Right = _____ %

Humidity Control

- _____
- _____
- _____

Air Leakage

- Moisture (Vapor) In and Out



Air Leakage

Define:

- Building Envelope
- Building Enclosure
- Thermal Envelope

Insulation and Air Seal

- Complete
- Continuous

Bulk Moisture - Water

- From Outside
- From Inside

Control Leaks: Plumbing, Roof

Weather Barriers: Housewrap, Zip Sheathing, Flashing, Proper Detailing and Installation

Carbon Monoxide

- Furnaces
- Water Heaters
- Combustion Safety

HVAC

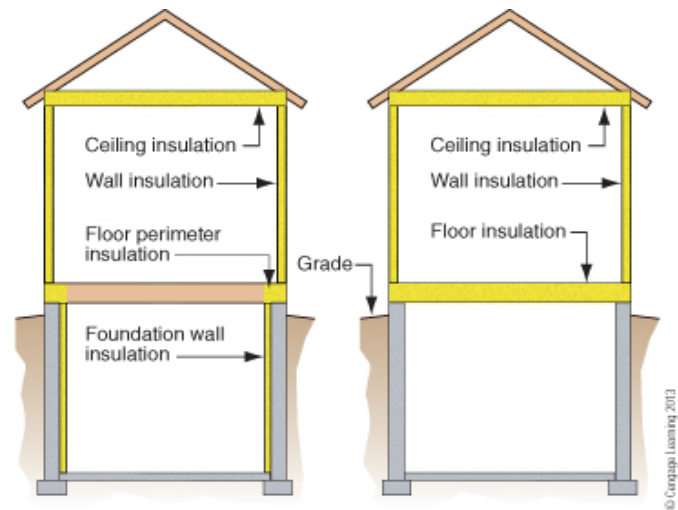
- Sealed Combustion
- Heat Pumps
- Ducts
 - Seal: _____
 - Don't Seal: _____
 - Install in Conditioned Space
 - Keeps Dirt Out of System
- Filters

Attached Garages

- Air Seal
- Ventilate
- No HVAC

Fireplaces

- Sealed
- Open
- Vented
- Vent Free
- Backdrafting



Healthier Buildings

- Control Air Leakage
- Manage Moisture
- Combustion Safety
- Ventilation
- Owner Behavior
- And....

Chemicals

- ~80,000 EPA Registered Chemicals
- ~16,000 Considered of Concern
- ~250 Tested
- Assumed Safe Unless Proven Otherwise

In Building Materials

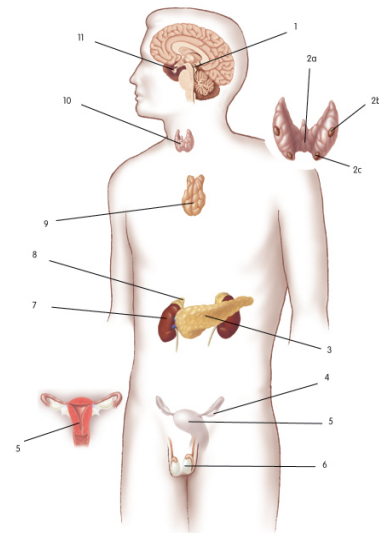
- Plastic
- Foam
- Wood Products
- Paint
- Adhesives
- Sealants
- Almost Everything

Endocrine System

- Secretes Hormones
- Tell Organs What to Do
- Endocrine Disruptors:
 - Chemicals that interfere with hormone actions and have adverse health effects

Endocrine Disruptors

- Persistent Organic Pollutants (POPs)
- Slow to Degrade
- Enter the Food Chain
- Bioaccumulate
- Magnify
- We are at the Top
- Affect:
 - Reproductive Systems
 - Immune Systems
 - Behavior
 - Diabetes
 - Cancer
- Exposure
 - Diet
 - Environment



Pollutants and POPs

- Demolition
 - Lead
 - Asbestos
- Construction Process
 - Building Materials
 - Solvents & Adhesives
- Occupancy
 - Furniture
 - Cleaning Products

VOCs

- Fast
 - Dissipate
 - Inhaled

Semi VOCs

- Slow
 - Persistent
 - Physical Contact

VOCs

- Formaldehyde
- Benzene
- Toluene
- Xylene
- Isocyanates
- Acetaldehyde

Used In:

- Plastics
- Paint
- Wood Composites
- Adhesives
- Insulation
- Furniture

SVOCs

- Phthalates
 - Plasticizers
- Perfluorinated Chemicals (PFCs)
 - Water & Stain Resistance
- Halogenated Flame Retardants (HFR)
- All Are Endocrine Disruptors



Phthalate Levels Connected to Reproductive Troubles

Dashing female libido and shrinking your son's male parts are now on the list of health hazards associated with phthalates. Now do we have your attention?

Used In:

- Flexible Vinyl
- Insulation
- Foam
- Stain Repellants

Isocyanates

- Foam Blowing Agents
- Paint Hardeners

Affect:

- Respiration
- Asthma

Heavy Metals

- Neurotoxins
 - Lead
 - Mercury
- Carcinogens
 - Cadmium
 - Chromium
 - Antimony

Used In:

- Vinyl Stabilizers
- Paint Additives
- Flame Retardants
- Solder

Plastics

- PVC (Polyvinyl Chloride) AKA Vinyl
- Dioxins
- Carcinogens
- Reproductive Toxicant
- Endocrine Disruptor

Vinyl

- Cheap, Easy, Low Maintenance
- Health Issues
- Disposal Issues

Rigid Foams

- Boards
- Flame Retardants
- Released During Installation

Soft Foams

- Carpet Pad
- Furniture Padding
- Flame Retardants
- Released During Use

Applied Foams

- Blown In Place
- Isocyanates
- Released During Application

Occupancy

- Fuel
- Solvents
- Cleaners
- Pesticides
- Furnishings
- Shower Curtains
- Gas Ranges
- Shoes in House

Material Selection Simplified

- Low and Zero VOC Finishes
- No Added Urea Formaldehyde (UF)
- Low VOC Cleaners and Solvents
- Avoid Vinyl and PVC
- Limit Use of Spray Foam
- Avoid Foam Carpet Pad
- Ventilate Before Occupancy

Materials – Digging Deeper

- Low VOC Products
- CA Section 01350 Testing Standards:
- Collaborate for High Performance Schools
- FloorScore
- GreenGuard Children & Schools
- Green Seal
- SCS – Indoor Advantage
- Health Product Declarations
- Declare Labels
- Material Transparency is an Evolving Process

What's a Poor Contractor to Do?

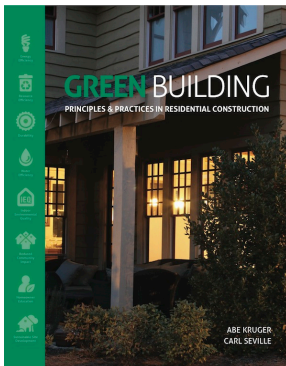
- Good Building Science
- Insulation
- Air Sealing
- Combustion Safety
- Ventilation
- Careful Material Selection
- Reduces Pollutants
- Leads to Healthier and Happier Clients

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Carl Seville is a green builder, educator, and consultant on sustainability to the residential construction industry. During his 25 years as a remodeling contractor, he led the development of Earthcraft House Renovation and supervised the pilot homes for that program.

His industry awards include the 2008 Excellence Award from Residential Design Build Magazine, the 2009 Energy Value Housing Award, the 2005 and 2007 Green Remodeling Advocate of the Year, the 2004 and 2006 National Green Building Awards, the Southface Energy Institute Award of Excellence, and the 2006 EarthCraft House Leadership award and the 2014 EarthCraft Renovation of the Year.

Carl is an NAHB Certified Trainer, a HERS rater and holds the LEED AP Homes and Green Rater designations. He certifies single and multifamily buildings under all major green building programs. He was a co-author of the USGBC/ASID ReGreen guidelines, *Green Building, Principles and Practices in Residential Construction* the first textbook on residential green building, and the LEED for Homes Version 4 reference guide. He is a contributing editor to greenbuildingadvisor.com where he writes the Green Curmudgeon blog and writes for numerous industry and consumer publications.



Resources:

- Greenbuildingadvisor.com
 - Comprehensive source for residential green building information
- Greenhomeguide.com
 - USGBC website connecting people with ideas, advice, and green home professionals
- Greensciencepolicy.org
 - Promotes responsible use of chemicals in products and materials
- Healthybuilding.net
 - Reports on healthy and green building materials
- NCHH.org
 - Conducts research on practical strategies to make homes safe and healthy
- Healthyhouseinstitute.com
 - Articles on and directory of healthy building products
- Greenwizard.com
 - Directory of building products with content information and green program compliance
- Buildinggreen.com
 - Publishers of Environmental Building News and Green Spec Directory
- Pharosproject.net
 - Evaluates and publishes information on building product contents
- http://perkinswill.com/sites/default/files/PerkinsWill_FlameRetardantAlternatives.pdf
 - Report regarding avoiding flame retardants in building materials